

US 36 Truss Bridge Rehabilitation

Schedule-Critical Deadline Met with Teamwork and Innovation

March 7, 2018



2018 PURDUE ROAD SCHOOL



AMERICAN
STRUCTUREPOINT
INC.

Who We Are

- Dave Day, PE
 - Senior Project Manager
 - 34 years with American Structurepoint, Inc.
 - Purdue University grad 1984
 - Indiana native



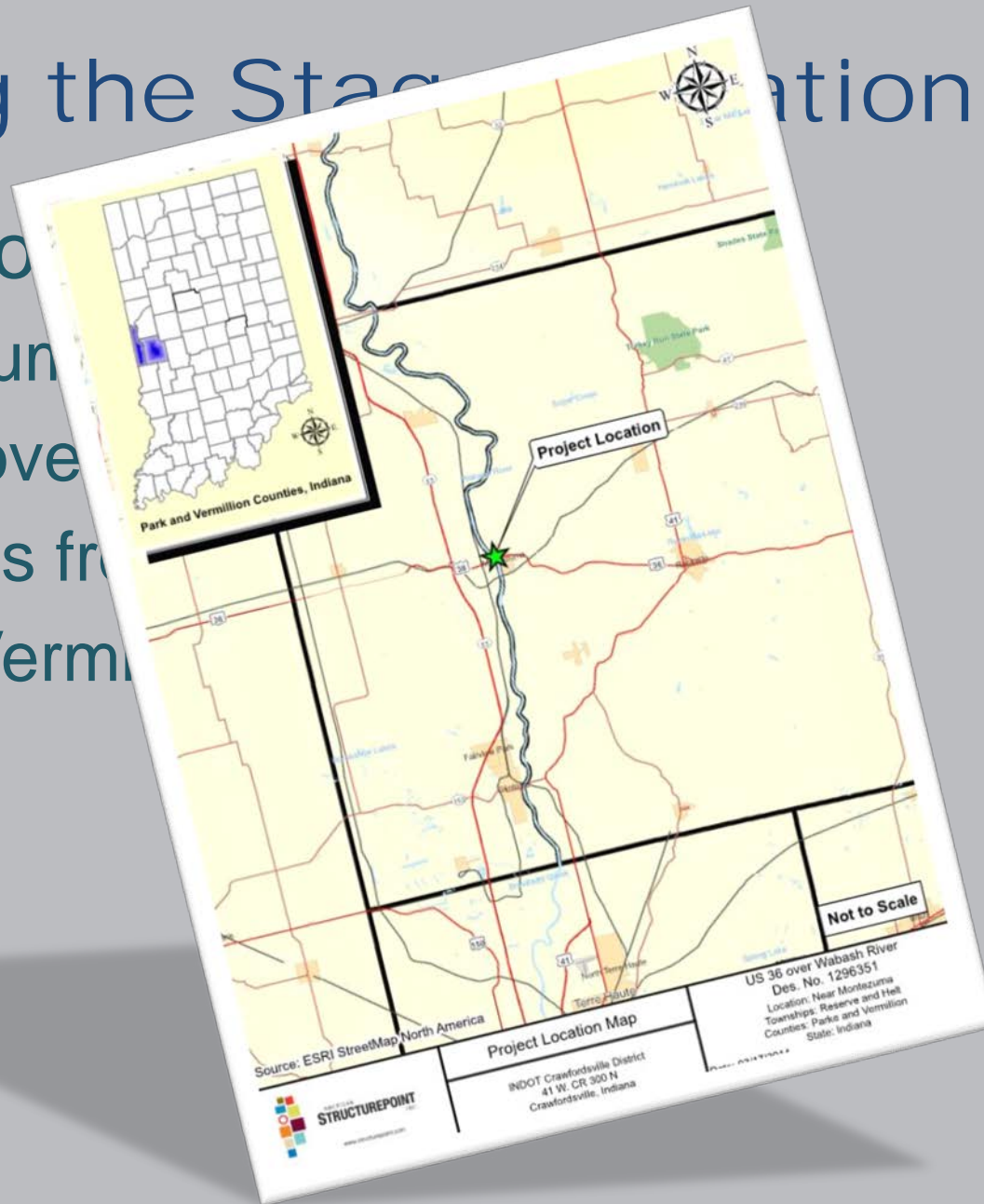
Who We Are

- Liz Kokosinski, PE
 - Project Engineer
 - Recently earned PE licensure
 - 5 years with American Structurepoint, Inc.
 - Involved with ASCE Younger Members (Secretary)
 - Purdue University grad 2013
 - From Chicagoland area



Setting the Stage

- Project Location
 - Montezuma
 - US 36 over
 - 8.5 miles from
 - Parke/Vermilion



Setting the Stage: Existing Conditions

- Built 1949
- 1270'-9 ½" Out-to-out bridge floor
 - (2) Approach Spans @ 28'-9"
 - (6) Main Spans @ 200'- 0 ¾"
- 32'-0" Out-to-out Coping (29'-4" Clear Roadway)
 - Two lanes of traffic, one each direction

Setting the Stage: Existing Conditions

- Load Rating
 - Posted for Load Capacity Restriction
 - Inventory H-rating = 15 tons
 - Inventory Rating = 28 tons
 - Operating Rating = 48 tons
- 7" deck rated 4 (Poor)
- Fracture-Critical Inspection – Fair Condition
- Rehabilitated twice in past (1987, 2005)







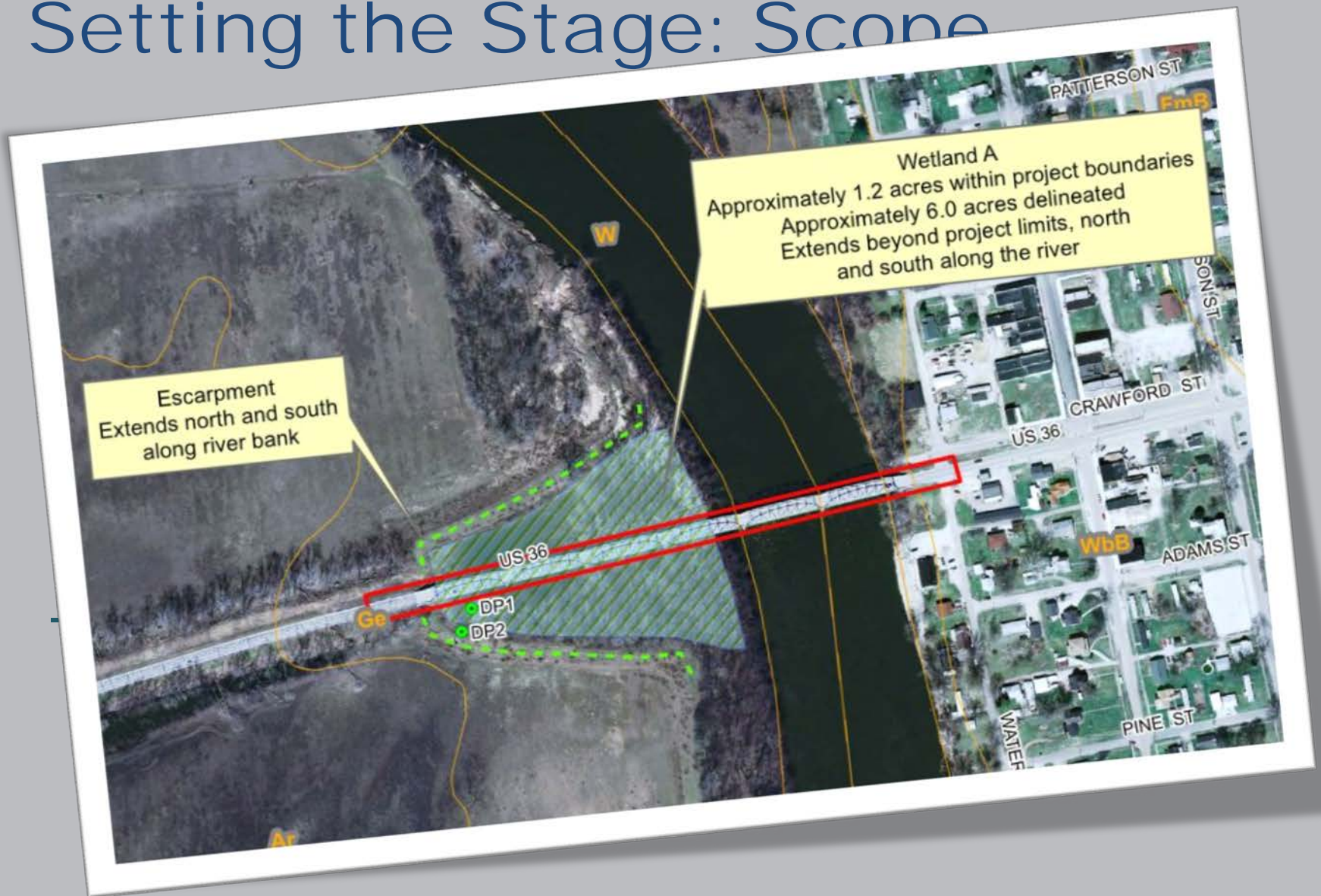


"DANGER"
CONFINED SPACE
PERMIT REQUIRED FOR ENTRY
CALL 307-662-1100

Setting the Stage: Scope

- Project Scope: Work Items
 - “Spot Improvement”
 - Rehabilitation (3R standards)
 - Slab and Concrete Barrier Replacement
 - Clean steel members
 - Expansion Joint Replacement
 - Overlay Approach Spans
 - Substructure patching
 - Resurfacing as needed on road approach
 - Update/Replace guardrail
 - Scour Protection
 - Cleaning/painting gusset plates behind proposed barrier rail (Change Order)

Setting the Stage: Scope



- Wide floodplain
- Critical access over Wabash River
- Truss bridge circa 1949– narrow, design exception, vertical clearance



Project Concerns

- **Schedule/Timeline**

- Parke County Covered Bridge Festival – October 2017

- **Maintenance of Traffic**

- Closure highly undesirable
- Temporary signal
 - Narrow width
 - Long phases due to bridge length
 - Emergency vehicle passage

Project Concerns

- **Environmental Impact**

- Scour protection required access through stretch of overbank with wetlands
- Installation of scour protection at piers immersed in channel

- **Load Rating**

- Structural analysis not part of scope – relied on results at Final Plans with Load Rating
- Submitted load rating request early on (expedite necessary design)
- Some stringer, floorbeam locations deficient in structural capacity – coordination with Load Rating Engineer

Project Solutions

- **Schedule/Timeline**

- Early push to expedite critical path of project development
- Coordination with permitting agencies to begin early in design process

- **Maintenance of Traffic**

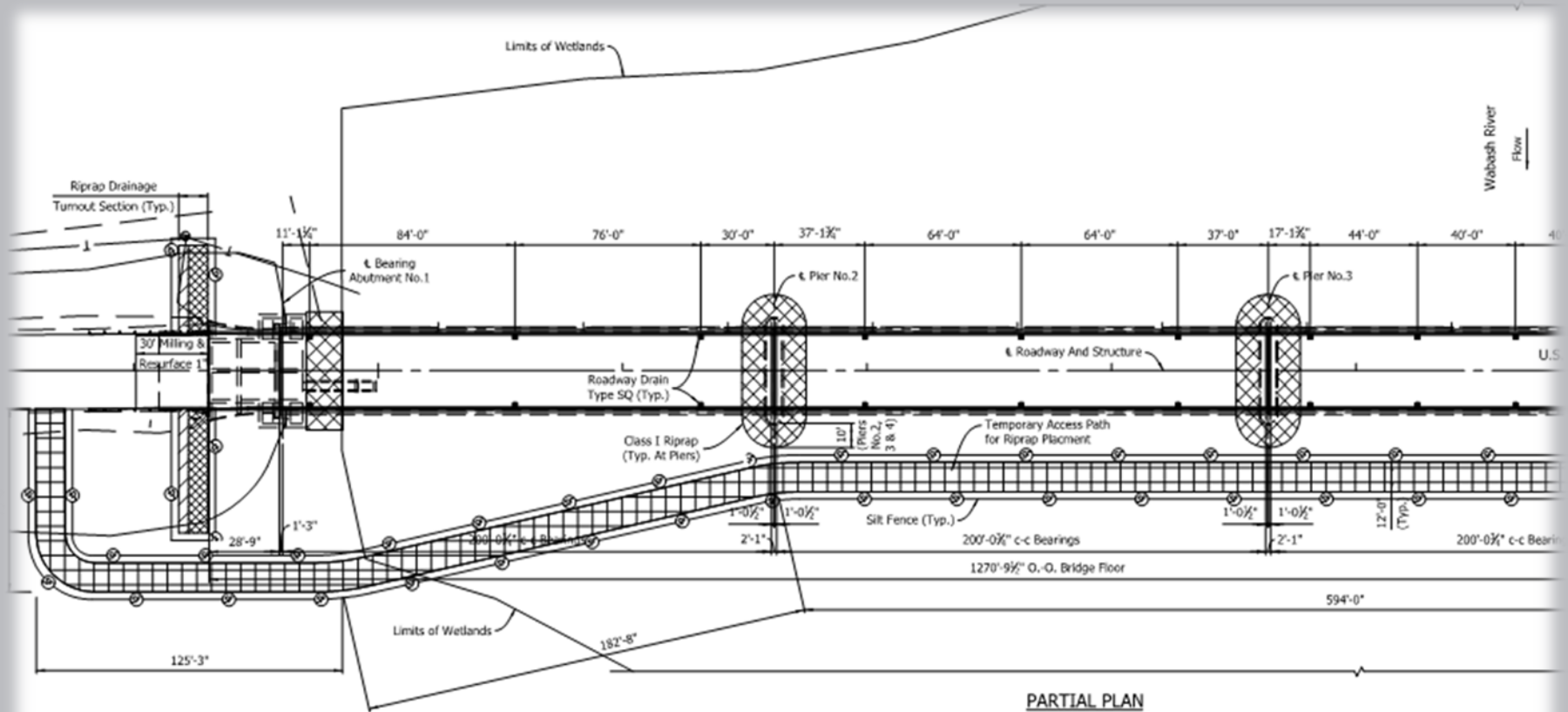
- Temporary signal utilized to avoid closure despite other challenges with this MOT scheme
- Wide-load detour
- Detection zone for traffic to mitigate delays
- Semi-actuated signal and preemption for emergency vehicles
- Notification of local emergency response during construction activity
- Weekend evening closures permitted to minimize LL deflections during deck pour

Project Solutions

- **Environmental Impact**

- Aggregate path installed for access to place riprap at exposed substructure elements
 - Required to be completely removed at end of construction
 - Temporary impact – did not need to mitigate
- Temporary aggregate loading platform
 - Barge installation of scour protection

Project Solutions



Project Solutions

- **Load Rating**

- Included quantity of structural steel for replacement at direction of Engineer
 - Structural replacement requires longer duration for fabrication
- Load rating results indicated some members may require strengthening...replacement?
- Alternate solution: Shear stud connectors in deficient areas
 - Raised rating sufficiently
 - Weldable steel or not? (Bolted vs. welded shear connectors)

Project Solutions

- **Load Rating**

- Approximate time/schedule savings:
4-6 weeks minimum (“unrealized” savings)
(fabrication, shop drawing review, installation)
- Inventory H-Rating = 33 tons (from 15 tons)
- Inventory Rating = 43 tons (from 28 tons)
- Structural Steel included for replacement = \$163,000 in low Construction Bid
- Shear Stud Connector cost = \$30,000
 - Hard to directly quantify exact cost savings, but stud installation eliminated full need for any structural steel replacement

Project Completion

- Letting= **February 8, 2017**
- Intermediate Completion Date (open to unrestricted traffic) = **Sept 15, 2017**
- Contract Completion Date= **September 30, 2018** (bundled contract)
- Parke County Bridge Festival **October 13-22, 2017**

SUCCESS!



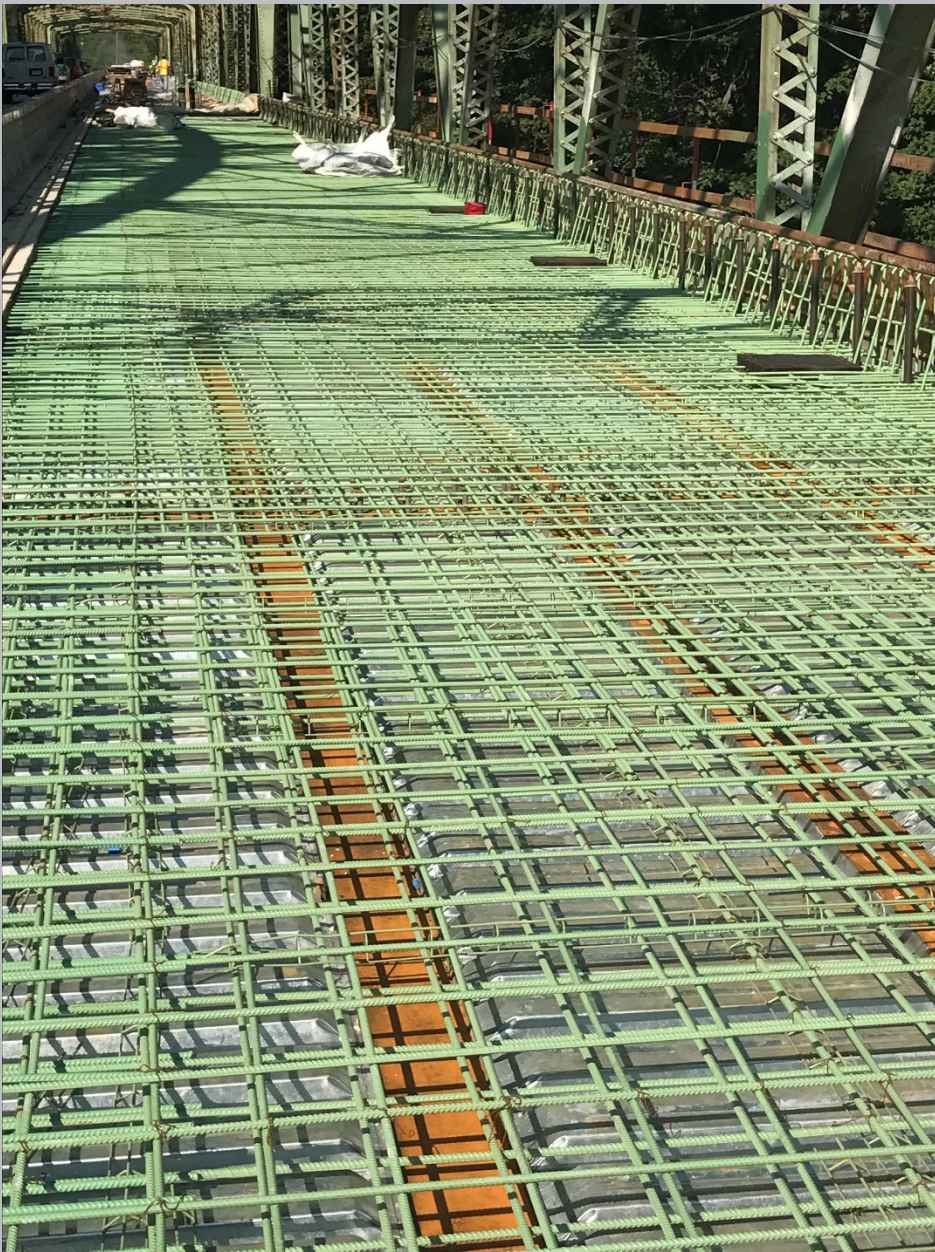




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General Project Management

“Quick Tips”

- **Identify unique elements early in project that may affect schedule, cost**
 - Environmental elements, concerns – Red Flag of key importance
 - Constructability
 - Design Exceptions
 - Level One Checklist – first, not last!
- **Begin permitting process, impact discussion in initial development of project**

General Project Management

“Quick Tips”

- **Plan for the worst, Hope for the best**
 - Comprehensive plan detailing for variable conditions
 - i.e. Welded vs. bolted shear stud connector details, quantity for structural steel for replacement
- **Be prudent**
 - “Open Roads” mentality



General Project Management

“Quick Tips”

- **Key word is COMMUNICATION**
 - Coordination with other agencies (ADA Committee, local and District Traffic, Storm Water)
 - Include INDOT PM on emails pertinent to design prior to submittals
 - Provide weekly/monthly status reports (if not requested)
- **Never just follow the mentality, “Well, it’s what we did on *that* project...”**
 - Constantly evaluate design approach for improvement, ingenuity, cost savings

THANK YOU!

Questions?



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